

ABSTRACT

A method is described for selectively etching a high k dielectric layer that is preferably a hafnium or zirconium oxide, silicate, nitride, or oxynitride with a selectivity of greater than 2:1 relative to silicon oxide, polysilicon, or silicon. The plasma etch chemistry is comprised of one or more halogen containing gases such as CF₄, CHF₃, CH₂F₂, CH₃F, C₄F₈, C₄F₆, C₅F₆, BCl₃, Br₂, HF, HCl, HBr, HI, and NF₃ and leaves no etch residues. An inert gas or an inert gas and oxidant gas may be added to the halogen containing gas. In one embodiment, a high k gate dielectric layer is removed on portions of an active area in a MOS transistor. Alternatively, the high k dielectric layer is used in a capacitor between two conducting layers and is selectively removed from portions of an ILD layer.